

WILLIAM L. BROWN

THE ANT LARVAE OF THE MYRMICINE TRIBES
BASICEROTINI AND DACETINI

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We have treated these two tribes together because they were considered as one tribe (Dacetini) by Emery (1922) and by Wheeler (1922). Recently Brown¹ (1949) separated out several genera to form a new tribe Basicerotini. Our studies of the larvae of three of these genera corroborate this separation, for they differ as a group from the Dacetini (as restricted by Brown) in body hairs, mandibles and maxillae. However, one might with equal justification split the larvae of the Dacetini (*sensu strictiore*) into three groups, which would differ from each other to at least as great a degree.

Tribe BASICEROTINI Brown

This tribe comprises some three dozen species in seven genera: *Basiceros*, *Aspididris*, *Creightonidris*, *Rhopalothrix*, *Octostruma*, *Heptastruma* and *Talaridris*. About half the species are in *Rhopalothrix*, which is Neotropical, Indomalayan, Papuan and Australian; the remaining genera are strictly Neotropical.

The larvae of the Basicerotini are a homogeneous group, if one can apply that adjective to only two types, for the larvae of *Basiceros* and *Aspididris* are generically indistinguishable. The tribe may be characterized as follows:—

Moderately stout. Thorax and first two abdominal somites strongly curved ventrally. Anus ventral. Somites distinct on the anterior half, indistinct on the posterior. Spiracles small. Body hairs numerous; short to long; uni-

¹We wish to thank Dr. W. L. Brown for material, for identifications and for advice.

formly distributed (except that some part of the midventral surface is naked), denticulate and of two types: (1) short and flexible; (2) a few long and slightly curved or flexible. Cranium vaguely subhexagonal in anterior view, but with the occipital border impressed at the middle. Clypeus bulging. Antennae minute. Head hairs long, flexible and denticulate. Ventral border of labrum spinulose, with two or three sensilla; posterior surface spinulose. Mandibles rather long and narrow, slightly curved medially; with one apical tooth and two teeth on the inner border; some part of the surface furnished with a few spinules or denticles. Each maxilla divided into two parts by a transverse lateral impression, the basal half swollen laterally and bearing the palp, the distal spinulose (at least in part) and bearing the galea; palp and galea digitiform. Labium with all surfaces spinulose; palp a low knob bearing five sensilla; an isolated sensillum between each palp and the opening of the sericteries; the latter a short transverse slit. Hypopharynx spinulose.

Genus *Basiceros* Schulz

Moderately stout. No neck, but thorax and first two abdominal somites strongly curved ventrally. Body hairs moderately numerous, of at least two types: (1) short, denticulate and flexible; (2) moderately long, denticulate and slightly curved. Labrum trilobed. Mandibles with two very stout medial teeth on the inner border; basal third of inner surface with minute spinules in arcuate subtransverse rows. Maxillae large; palp with four apical sensilla. Labium large.

Basiceros sp.

(Pl. 10, figs. 16 and 17)

Body moderately stout; diameter greatest at abdominal somite IV, decreasing gradually to I, then increasing slightly to the mesothorax; thorax and first two abdominal somites strongly curved ventrally. Anus ventral. Spiracles small, mesothoracic slightly larger than the rest. Integument of ventral surface of thorax with spinules in transverse rows. Body hairs moderately numerous and uniformly

distributed. Of at least two types: (1) denticulate, flexible, short (about 0.16 mm), without alveolus and articular membrane, probably the more abundant type; (2) denticulate, slightly curved, moderately long (about 0.25 mm), with alveolus and articular membrane. Cranium vaguely subhexagonal in anterior view; a third broader than long; occipital border impressed at the middle; genae and clypeus bulging. Antennae minute, each with three sensilla, each of which bears a spinule. Head hairs moderately numerous, long (0.108-0.26 mm), flexible and denticulate. Labrum short (breadth 2.3 times length), trilobed, anterior surface of each lateral lobe with eleven minute hairs and/or sensilla, ventral border of each lateral lobe with two contiguous sensilla; whole ventral border spinulose; posterior surface spinulose, the spinules near the lateral borders isolated and rather long, the remainder minute and in numerous subtransverse rows; posterior surface of each lateral lobe with a cluster of four sensilla. Mandibles moderately sclerotized; long and narrow, slightly curved medially; apical tooth slender, slightly curved and round pointed; two much stouter teeth projecting inward from the inner border; basal $\frac{1}{3}$ of the inner surface with minute spinules in short arcuate subtransverse rows. Maxillae large, with a lateral swelling bearing the palp and a paraboloidal apex bearing the galea; apex spinulose; palp digitiform with four apical sensilla (two encapsulated and two with a spinule each); galea digitiform with two apical sensilla. Labium large, with all surfaces spinulose, the spinules in short subtransverse rows; palp a low knob with five apical sensilla (two encapsulated and three bearing a spinule each); opening of sericteries a transverse slit. Hypopharynx spinulose. (Material studied: one damaged semipupa from "Hamburg Farm", Costa Rica; worker identified by Dr. W. L. Brown as *B. sp. near singularis* (F. Smith).)

Genus *Aspididris* Weber

Moderately stout. No neck, but thorax and first two abdominal somites strongly curved ventrally. Body hairs moderately numerous, denticulate and of two types: (1) short and flexible; (2) long, curved or flexible, about a

dozen on each somite (except abdominal somites IX and X). Mandibles with two moderately stout medial teeth; a small patch of minute spinules on the medial surface just above the middle. Maxillary palp with five sensilla. Labium large.

Aspididris militaris Weber

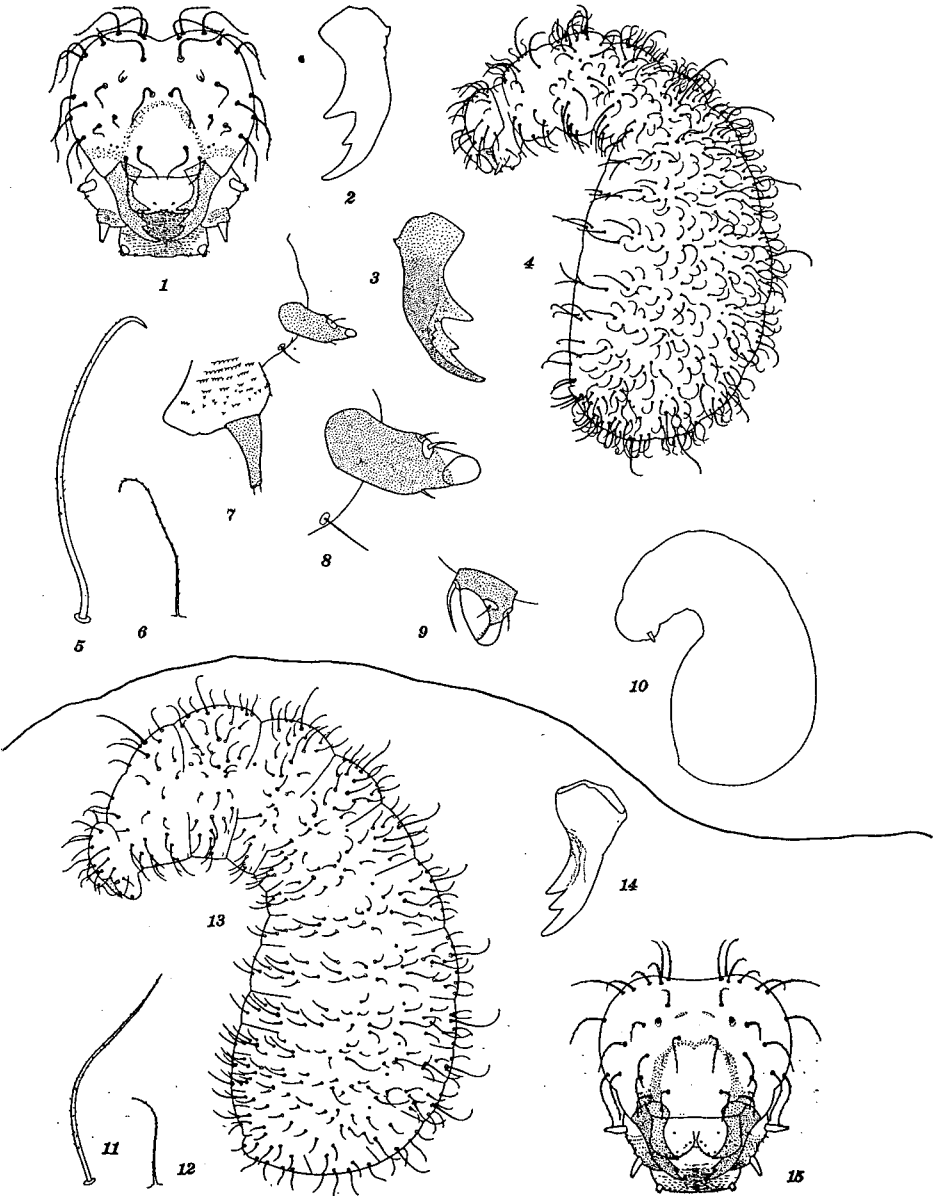
(Pl. 6, figs. 11-15)

Body moderately stout; diameter greatest at abdominal somites V and VI, decreasing to I, then increasing slightly to the mesothorax, then decreasing rapidly to less than the diameter of the head. Thorax and first two abdominal somites strongly curved ventrally; dorsal profile C-shaped, ventral J-shaped. Anus ventral. Leg and wing vestiges present. Spiracles small, mesothoracic slightly larger than the rest. Integument of the ventral surface of the thorax and abdominal somites I and II spinulose, the spinules in rather short subtransverse rows. Body hairs numerous and uniformly distributed except for a naked strip on the midventral surface of the thorax and abdominal somites I and II. Of two types: (1) short (about 0.19 mm), flexible, denticulate, on all somites, without alveolus and articular membrane; (2) long (about 0.32 mm), curved or flexible, denticulate, with alveolus and articular membrane, about a dozen on each somite except abdominal somites IX and X. Cranium vaguely subhexagonal in anterior view; a third broader than long; occipital border feebly impressed at the middle; clypeus bulging. Antennae minute, each with three sensilla, each of which bears a spinule. Head hairs moderately numerous, long (0.09-0.193 mm), flexible

EXPLANATION OF PLATE 6

Rhopalothrix gravis Mann, Figs. 1-10. — 1, head in anterior view, $\times 76$; 2, left mandible in anterior view, $\times 148$; 3, left mandible in posterior view, $\times 148$; 4, immature(?) larva in side view, $\times 32$; 5 and 6, two types of body hairs, $\times 185$; 7, left maxilla in anterior view, $\times 235$; 8, left maxillary palp in anterior view, $\times 470$; 9, left labial palp in posterior view, $\times 470$; 10, profile of mature larva in side view. (After Menozzi, 1936).

Aspididris militaris Weber, Figs. 11-15. — 11 and 12, two types of body hairs, $\times 109$; 13, larva in side view, $\times 20$; 14, left mandible in anterior view, $\times 95$; 15, head in anterior view, $\times 53$.



WHEELER AND WHEELER — BASICEROTINI

and denticulate. Labrum bilobed; breadth about twice the length; anterior surface of each lobè with seven minute hairs and/or sensilla; ventral border of each lobe with two contiguous sensilla and numerous rather long isolated spinules; posterior surface spinulose, the spinules near the lateral borders isolated and rather long, the remainder minute and in numerous subtransverse rows; posterior surface of each lateral lobe with two isolated and a cluster of four sensilla. Mandibles heavily sclerotized; moderately long and narrow, slightly curved medially; apical tooth moderately stout, slightly curved and round-pointed; two moderately stout teeth projecting inward from the inner border; a small patch of minute spinules (in short rows) on the inner surface just above the middle. Maxillae with a slight lateral swelling bearing the palp and a paraboloidal apex bearing the galea; apex spinulose, the spinules rather long and in short rows, elsewhere short and isolated; palp digitiform with one lateral (bearing a spinule) and four apical (two encapsulated and two with a spinule each) sensilla; galea digitiform with two apical sensilla. Labium large, with all surfaces spinulose, the spinules in short subtransverse rows; palp a low knob with five apical sensilla (three with a spinule each); an isolated sensillum on each side of the opening of the sericteries; the latter a short transverse slit. Hypopharynx spinulose. (Material studied: two larvae from British Guiana, courtesy of Dr. Neal A. Weber.)

Genus *Rhopalothrix* Mayr

Thorax and first two abdominal somites forming a stout neck which is strongly curved ventrally; rest of abdomen much plumper; posterior end broadly rounded. Body hairs numerous, denticulate and of two types: (1) slender, flexible, short to moderately long; (2) stout, slightly curved, with hooked tip, in a narrow irregular band around the middle of each somite. Labrum small. Mandibles with two medial teeth, the subapical small, the proximal large; with three or four denticles on the distal half of the posterior surface. Maxillae large; palp with five sensilla.

Rhopalothrix gravis Mann

(Pl. 6, figs. 1-10)

IMMATURE: Length about 2.8 mm. Somewhat stout; thorax and first abdominal somite forming a neck which is strongly curved ventrally, remainder of abdomen with the dorsal profile curved and the ventral nearly straight; posterior end broadly rounded. Anus ventral, with a distinct posterior lip. Spiracles rather small. Integument of the ventral surface of the thorax and abdominal somites I and II with a few short transverse rows of minute spinules. Body hairs numerous and uniformly distributed, except scarce on the ventral surface. Of two types: (1) slender, flexible, denticulate, short to moderately long (0.09-0.11 mm), without alveolus and articular membrane, on the dorsal and lateral surfaces, the more abundant type; (2) stout, of nearly uniform diameter, slightly curved, with a short sharp apical hook, denticulate, short to long (0.09-0.22 mm), with alveolus and articular membrane, in a narrow irregular band around the middle of each somite. Head moderately large; cranium somewhat broader than long, vaguely subhexagonal in anterior view, but with the occipital border strongly impressed at the middle; clypeus bulging. Antennae minute, each with three sensilla, each of which bears a spinule. Head hairs few, long (0.09-0.14 mm), flexible and denticulate. Labrum small, breadth twice the length, feebly bilobed; anterior surface of each lobe with 4 or 5 minute hairs and/or sensilla; lateral borders with isolated coarse spinules; ventral border of each lobe with minute spinules in short rows and with one isolated and two contiguous sensilla; posterior surface of each lobe with two isolated and two contiguous sensilla; whole posterior surface spinulose, the spinules minute and in numerous rows, the rows transverse on the middle half. Mandibles heavily sclerotized, long and slender, slightly curved medially; apical tooth long and rather slender; with two teeth projecting inward from the inner border (the distal small and the proximal large); with 3 or 4 denticles on the distal half of the posterior surface. Maxillae large; each divided into two parts by a transverse lateral impression, the basal part swollen laterally and bearing the palp,

the distal part spinulose, bearing the galea and having a conoidal apex; palp digitiform with five sensilla (two apical and encapsulated, three subapical and bearing a spinule each); galea a slender frustum bearing two apical sensilla. Labium densely spinulose, the spinules in short subtransverse rows; palp a low knob with five sensilla (two apical and encapsulated, three subapical and bearing a spinule each); an isolated sensillum between each palp and the opening of the sericteries; the latter a transverse slit. Hypopharynx densely spinulose, the spinules long and in numerous transverse rows. (Material studied: three larvae from Costa Rica.)

Menozzi, 1936, pp. 84-85: "Descrizione della larva matura di *R. Schmidt*² n. sp. Ipocefala, col corpo di forma subclaviforme, con la porzione anteriore stretta, subcilindrica e coi segmenti distinti, quella posteriore é rigonfiata ed i limiti dei segmenti non sono distintamente segnati. Di colore bianco sporco, col capo cremeo e con le porzioni sclerificate del pleurostoma, del margine anteriore del clipeo, nonché delle mandibole e del peritrema degli spiracoli tracheali di colore ocraceo più o meno intenso. Cranio visto dal dorso più largo che lungo, oppure così largo che lungo se ad esso si comprende anche il labbro superiore, coi lati arrotondati e leggermente convergenti in avanti e col margine occipitale lievemente impresso nel mezzo; le lunghe setole di cui esso é provvisto sono finemente barbellate . . . Aree antennali di forma triangolare, situate sublateralmente sulla linea medio-trasversale del cranio, fornite ciascuna nel mezzo di tre sensilli, al centro dei quali si erge una piccola appendice spiniforme che é ben visibile anche alla semplice osservazione binoculare della larva in toto. Il clipeo appare circoscritto ai lati da un sottile ispessimento sclerificato, che per trasparenza sembra come una semplice piega tegumentale, ma che trovandosi in tutti gli esemplari esaminati, non mi pare dubbio che tali pieghe segnano effettivamente i margini laterali di esso. Il labbro superiore, separato dal clipeo da un leggero solco, é trasverso, coi lati fortemente arrotondati alla base e col margine anteriore incavato nel mezzo. Dorsalmente esso é provvisto di un certo numero di sensilli chetici; . . . ventral-

²Dr. W. L. Brown regards *schmidt* as a synonym of *gravis*.

mente la superficie é tutta cosparsa di piccoli processi tegumentali dentiformi, nonché di 6 papille bacilliformi collocate in numero di tre ad ogni lato della incavatura mediana del margine anteriore e di due aree sensoriali le quali, portano due sensilli ciascuna, di cui uno molto più grande dell'altro. Le mandibole sono robuste, del doppio più lunghe che larghe e tridentate. Le mascelle appaiono ciascuna come formate di un unico pezzo, di mode che lo sclerite stipetale, quello cardinale e il cardine non sono differenziati, o almeno, non sono riuscito, come tali, ad individuarli. Palpo mascellare un poco più lungo che largo, provvisto di tre setole, due nel lato anteriore ed una in quello posteriore, ed apicalmente di due vistosi sensilli a forma di flabello. Galea del doppio più lunga che larga, gradatamente ristretta dalla base all'apice, fornita distalmente di due sensilli bacilliformi che sorgono ciascuno da una rispettiva area rotondeggiante sclerificata e ben distinta dal resto della membrana circostante. Labbro inferiore più lungo che largo, di un terzo circa sporgente oltre le mascelle, coi lati ed il margine anteriore pressoché diritti. Palpo labiale così lungo che largo, con una setoletta per ciascun lato, un sensillo placode al dorso e due all'apice di forma simile a quelli del palpo mascellare. Tanto le mascelle che il labbro inferiore nella superficie orale non hanno alcuna setola o peluzzo, mentre in quella dorsale hanno un certo numero di peluzzi disseminati nel lato esterno delle mascelle e lungo la linea longitudinale mediana nel labbro inferiore. Tutto il corpo della larva é cosparsa di setole eguale a quelle del capo, inoltre gli urotergiti 1—8 sono forniti di tre aptochete ciascuno . . . Sistema tracheale olopneustico, con 10 paia di spiracoli, dei quali due paia nel torace e otto paia nell'addome, situati nella regione pleurale di ciascun segmento. Lunghezza della larva naturalmente curvata mm. 2, 3; lunghez. del capo senza il labbro superiore mm. 0,62, larghezza mm. 0,93." Fig. 2 (p. 84), larva in side view and head in anterior view; Fig. 3 (p. 85), details of mouth parts and a hair.

Tribe DACETINI Forel

This tribe (in the restricted sense) comprises about 300 species in 29 genera, according to Dr. W. L. Brown (*in*

litt.). The largest genus is *Strumigenys* with some 200 species; next is *Smithistruma*, with about 56 species; the other genera are quite small with fewer than ten species each. The tribe is essentially tropical but a few genera range into the warmer parts of the North Temperate Zone.

The adults form "an aberrant and sharply distinct group belonging to the subfamily Myrmicinae, as is demonstrated by the structure of the abdominal pedicel and the male genitalia" (Brown, 1953*b*, p. 465). They show an extreme reduction in the number of antennal segments; head shape, head hairs and mandibles could be characterized as bizarre. Their larvae—in contrast—are quite ordinary and far less specialized than the larvae of many other ant genera.

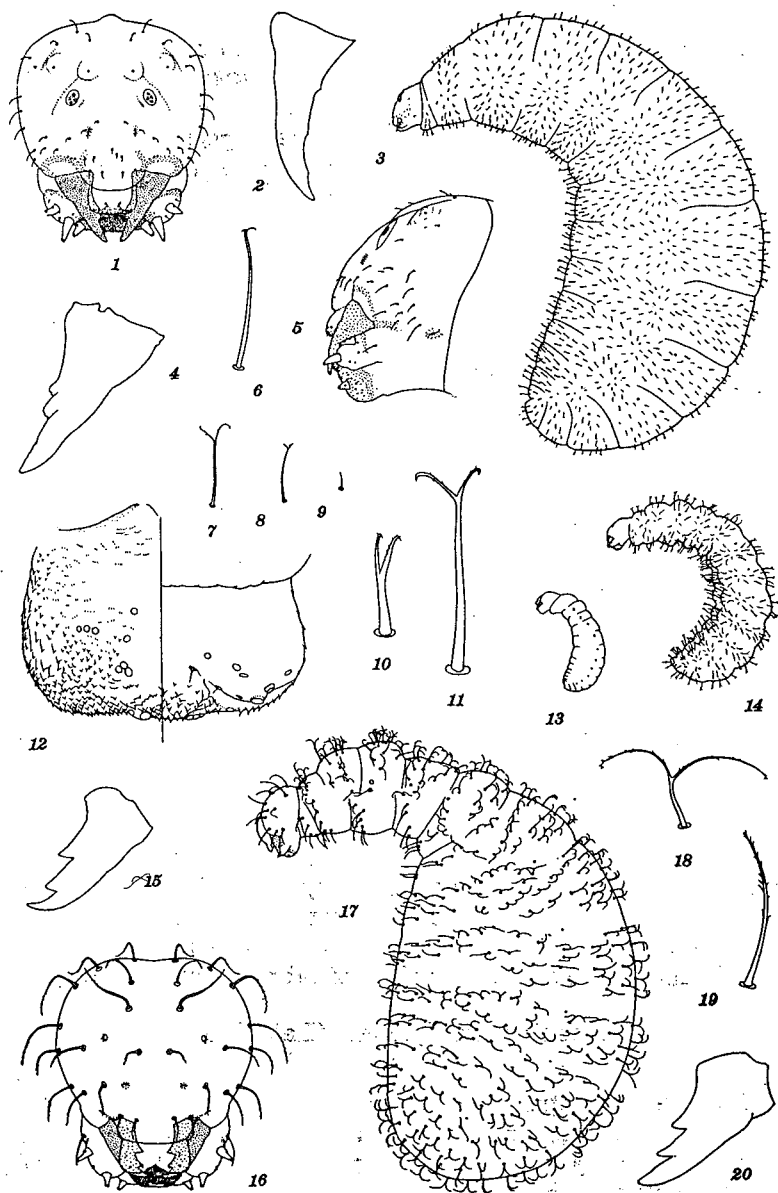
The larvae of the Dacetini are a heterogeneous group but not more so than most other tribes of Myrmicinae. *Daceton* is easily separated. *Strumigenys* and *Smithistruma* are quite distinct from other genera, although they are not distinguishable from each other. The remaining genera in our collection, although more similar to each other, are still something of a mélange. This grouping of the larvae confirms somewhat Brown's recent (1953*b*) division of the Dacetini into subtribes: Dacetiti (including *Daceton*); Orectognathiti (including *Orectognathus*); Epopostrumiti (including *Epopostruma*, *Mesostruma*, *Alistruma* and *Clarkistruma*); and Strumigeniti (including *Strumigenys* and *Smithistruma*). The tribe may be characterized as follows:—

EXPLANATION OF PLATE 7

Daceton armigerum (Latreille), Figs. 1-14.—1, head in anterior view, $\times 36$; 2, left mandible in lateral view, $\times 86$; 3, mature larva in side view, $\times 8$; 4, left mandible in anterior view, $\times 86$; 5, head in side view, $\times 36$; 6-8, 10 and 11, bifid-tipped body hairs, $\times 185$; 9, simple body hair, $\times 185$; 12, labrum (left half of drawing shows posterior view, right half, anterior view), $\times 185$; 13, very young larva in side view (hairs omitted), $\times 8$; 14, young larva in side view, $\times 8$.

Epopostruma sp. from Victoria, Figs. 15-19.—15, left mandible in anterior view, $\times 185$; 16, head in anterior view, $\times 109$; 17, larva in side view, $\times 30$; 18 and 19, two types of body hairs, $\times 185$.

Epopostruma sp. from South Australia, Fig. 20, left mandible in anterior view, $\times 185$.



WHEELER AND WHEELER — DACEINI

Anus ventral. Spiracles small. Body hairs of the most abundant type bifid, and except in *Clarkistruma*, denticulate. Head hairs few (20-30), except moderately numerous (52) in *Daceton*. Labrum small; posterior surface spinulose. Mandibles subtriangular in anterior view; with one apical and (except in *Daceton*) two medial teeth; no spinules or denticles on the surfaces. Maxillae usually without spinules (occasionally a few present). Palp a conspicuous protuberance bearing five sensilla (usually two encapsulated and three bearing each a spinule), except in *Strumigenys* and *Smithistruma*. Galea tall and rather slender. Anterior surface of labium spinulose; palp resembling maxillary palp but shorter; an isolated sensillum between each palp and the opening of the sericteries; the latter a short transverse slit. Hypopharynx spinulose.

Brown, 1953b, p. 467: "No dacetine was ever observed to feed the larvae by regurgitation . . . Food delivered to and fed upon by the Australian dacetine larvae consisted only of Collembola."

Genus *Daceton* Perty

Somewhat stout; thorax and first two abdominal somites strongly curved ventrally but not forming a neck; diameter greatest at abdominal somites IV and V, decreasing gradually to the anterior end and more abruptly to the posterior end, which is round-pointed; dorsal profile C-shaped, ventral J-shaped. Body hairs numerous. Of two types: (1) short, nearly straight, with short-bifid tip, each branch recurved and bearing short denticles; (2) very few, widely scattered, simple, minute. Antennae moderately large; with three to five sensilla each. Head hairs short, simple or with short-bifid tip. Posterior surface of labrum with 16 sensilla.

Daceton armigerum (Latreille)

(Pl. 7, figs. 1-14)

MATURE WORKER LARVA: Length about 12 mm. Somewhat stout; thorax and first two abdominal somites strongly curved ventrally but not forming a neck; diameter greatest at abdominal somites IV and V, decreasing gradually to the anterior end and more abruptly to the posterior end,

which is round-pointed; dorsal profile c-shaped, ventral J-shaped. Anus ventral. Leg, wing and gonopod vestiges present. Spiracles small. Integument apparently without spinules. Body hairs numerous and uniformly distributed, except for the naked midventral surface; the longest and stoutest hairs border this naked area. Of two types: (1) short (0.105-0.175mm), nearly straight, with short-bifid tip, each branch recurved and denticulate; (2) very few, widely scattered, simple, minute (about 0.009 mm). Head small; cranium about as long as broad; vaguely subpentagonal in anterior view, with a small dorsal projection from the middle of the occipital border. Each antenna mounted on a drumlin-shaped convexity, with three (sometimes four or five) sensilla, each of which bears a spinule. Head hairs moderately numerous, short (0.024-0.072 mm), simple or with short-bifid tip. Labrum very small, subrectangular, about twice as broad as long; anterior surface with a pair of ventrolateral convexities, each of which bears nine or ten sensilla and/or minute hairs; near the ventral border the middle of the anterior surface is coarsely spinulose; ventral border coarsely spinulose and bearing four to six sensilla; lateral borders coarsely spinulose; posterior surface coarsely spinulose near the lateral and ventral borders, elsewhere beset with a few minute spinules (except for the center which is smooth); posterior surface with about 16 sensilla. Mandibles heavily sclerotized; straight and subtriangular in anterior view, curved posteriorly; apex stout, straight and blunt; inner border with two blunt teeth near the middle. Maxillae with the apex paraboloidal and directed medially, on its outer surface a patch of large isolated spinules; palp digitiform with five sensilla (one lateral, two subapical and two apical); galea a tall cone with two apical sensilla. Labium densely spinulose, the spinules isolated and rather large; palp a skewed peg, with one lateral and four apical sensilla; an isolated sensillum between each palp and the opening of the sericteries; the latter a short transverse slit. Hypopharynx with a few minute spinules in short transverse rows.

YOUNG LARVA: Length about 5.5 mm. Subcylindrical; strongly curved ventrally; thorax with a pair of ventro-

lateral bosses on each somite. Segmentation distinct. Body hairs moderately numerous and uniformly distributed; hairs short (0.035-0.15 mm), with short-bifid tip. Otherwise similar to the mature larva.

VERY YOUNG LARVA: Length about 2.4 mm. Subcylindrical, but somewhat constricted at the mesothorax and metathorax. Anus terminal. Body hairs moderately numerous, except for large naked intersomitic areas; with short-bifid tip, short to moderately long (0.035-0.105 mm). Head hairs simple. Otherwise similar to the young larva.

Material studied: numerous larvae from British Guiana.

Genus *Orectognathus* F. Smith

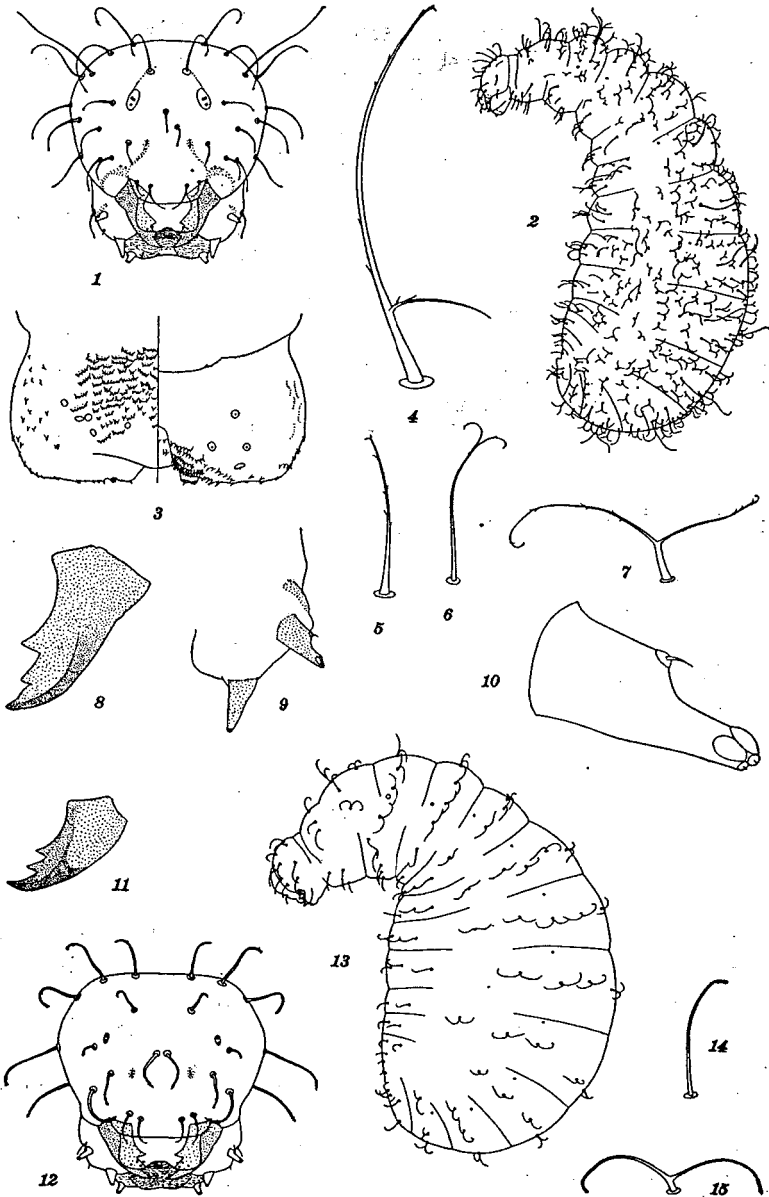
Shaped somewhat like a crookneck squash; thorax and first abdominal somite curved ventrally; diameter greatest at abdominal somite v, decreasing gradually toward the anterior end and more rapidly toward the posterior end, which is broadly rounded. Body hairs moderately numerous. Of three types: (1) short to moderately long, bifid, with the branches equal, short to long, denticulate and recurved at the tip, the most abundant type; (2) on the ventral surface, short to moderately long, slightly curved, distal half denticulate, usually with a minute hook at the tip; (3) a few on the dorsal and lateral surfaces of each somite, long, sparsely denticulate, with a minute hook at the tip and a short denticulate lateral branch near the base. Antennae moderately large, with two or three sensilla each. Head hairs short to long, flexible, with a few

EXPLANATION OF PLATE 8

Orectognathus clarki Brown, Figs. 1, 2 and 4-10.—1, head in anterior view, $\times 67$; 2, larva in side view, $\times 20$; 4, long body hair with unequal branches, $\times 235$; 5, denticulate body hair, $\times 235$; 6 and 7, body hairs with equal branches, $\times 235$; 8, left mandible in anterior view, $\times 185$; 9, left maxilla in anterior view, $\times 185$; 10, left maxillary palp in anterior view, $\times 730$.

Orectognathus satan Brown, Fig. 3, labrum (left half of drawing shows posterior view, right half, anterior view), $\times 235$.

Clarkistruma alinodis Forel, Figs. 11-15.—11, mandible in anterior view, $\times 185$; 12, head in anterior view, $\times 105$; 13, larva in side view, $\times 37$; 14 and 15, two types of body hairs, $\times 185$.



WHEELER AND WHEELER — DACETINI

denticles near the tip. Posterior surface of labrum with ten sensilla. Labium feebly bilobed; anterior surface with two or three slight swellings.

Orectognathus clarki Brown

(Pl. 8, figs. 1 and 2 and 4-10)

MATURE WORKER LARVA: Length about 3.8 mm. Shaped somewhat like a crookneck squash; thorax and first abdominal somite curved ventrally; diameter greatest at abdominal somite V, decreasing gradually toward the anterior end and more rapidly toward the posterior end, which is broadly rounded. Anus ventral, with a small posterior lip. Leg and wing vestiges distinct. Spiracles small. Integument of the ventral surface of the thorax and abdominal somites I and II and of the dorsal surface of a few posterior somites with a few transverse rows of minute spinules. Body hairs moderately numerous. Of three types: (1) short to moderately long (0.07-0.14 mm), bifid, with the branches short to long, equal, denticulate and recurved at the tip, on the lateral and dorsal surfaces, the most abundant type; (2) on the ventral surface, short to moderately long (0.07-0.175 mm), slightly curved, distal half denticulate, usually with a minute hook at the tip; (3) a few (about eight) on the dorsal and lateral surfaces of each somite, long (0.175-0.245 mm), sparsely denticulate, with a minute hook at the tip and a short denticulate lateral branch near the base. Cranium vaguely subhexagonal in anterior view, scarcely broader than long. Antennae with two or three sensilla, each bearing a spinule. Head hairs few, short to long (0.035-0.175 mm), flexible, with a few denticles near the tip. Labrum small; subrectangular, width twice the length; with a median impression of the ventral border which extends as a trough onto the anterior surface; anterior surface of each half with four minute hairs and/or sensilla; lateral borders with a few isolated spinules; ventral border with minute spinules and two contiguous sensilla; posterior surface smooth near the ventral border, elsewhere spinulose, the spinules minute and in short transverse rows medially, but isolated laterally; posterior surface with about 10 sensilla. Mandibles heavily sclerotized,

subtriangular in anterior view; body curved medially and produced inward to form a blade which bears two stout teeth on its inner border. Maxillae with the apex paraboloidal and directed medially; palp chair-shaped with five sensilla (two apical and bearing a minute spinule each, two subapical and encapsulated, one lateral and bearing a large spinule); galea conical with two apical sensilla. Labium feebly bilobed, anterior surface with three slight swellings (one basal and an anteroventral on each side); anterior surface densely spinulose, the spinules minute and in short transverse rows; palp similar to maxillary palp but shorter; an isolated sensillum between each palp and the opening of the sericteries; the latter a short transverse slit in a ventral depression. Hypopharynx spinulose, the spinules minute and in moderately long transverse rows.

VERY YOUNG LARVA: Length about 1.4 mm. Subcylindrical; hairs seemingly more abundant; otherwise very similar to the mature larva.

Material studied: 18 larvae from Victoria (Australia); courtesy of Dr. W. L. Brown, who believes that the larvae feed on Collembola (Brown, 1953b).

Orectognathus mjobergi Forel

Apparently very similar to *clarki*, except cranium transversally subelliptical. (Material studied: 5 damaged integuments from Queensland.)

Orectognathus satan Brown

(Pl. 8, fig. 3)

Generally similar to *clarki*, except in the following details: Head subcordate in anterior view due to a median impression of the occipital border. Spinules on the posterior surface of the labrum fewer and larger. Mandibles with the apical tooth longer and stouter, the blade shorter and narrower, medial teeth sharper-pointed. Maxillae with a few minute spinules on the apex. Anterior surface of labium with only two swellings and with the spinules longer but fewer. Hypopharynx with the spinules larger and in longer rows. (Material studied: a dozen immature (?) larvae from Queensland; courtesy of Dr. W. L. Brown.)

Orectognathus versicolor Donisthorpe

MATURE LARVA: Length about 3 mm. Generally similar to *clarki* but differing in the following details: Mandibles with the apical tooth shorter and stouter and the blade narrower. Anterior surface of labium with only two swellings, the spinules moderately abundant; palp a skewed frustum. (Material studied: numerous larvae from Queensland and New South Wales.)

Genus *Epopostruma* Forel

Shaped somewhat like a crookneck squash; thorax and first abdominal somite forming a long and rather slender neck; metathorax constricted. Remainder of abdomen very stout; dorsal profile C-shaped, ventral nearly straight; segmentation indistinct. Body hairs short and moderately numerous. Of two types: (1) slightly curved, with the distal 2/3 denticulate, a few on the ventral surface; (2) bifid, with the branches denticulate. Antennae minute; with three sensilla each. Head hairs moderately long, flexible, with the distal half denticulate. Posterior surface of labrum with 12 sensilla. Middle 2/3 of labium raised into a ventral projection.

Epopostruma sp.

(Pl. 7, figs. 15-19)

Length about 3.4 mm. Shaped somewhat like a crookneck squash; thorax and first abdominal somite forming a long and rather slender neck, which is bent ventrally to 90°; metathorax constricted. Remainder of abdomen very stout; dorsal profile C-shaped, ventral profile nearly straight; segmentation indistinct. Anus ventral. Leg vestiges indistinct. Spiracles small; the mesothoracic the largest, diameter decreasing posteriorly. Integument of the ventral surface of the thorax and anterior abdominal somites and the dorsal surface of the posterior somites spinulose, the spinules minute and in short transverse rows. Body hairs moderately numerous; uniformly distributed, except for naked intersomitic areas. Of two types: (1) short (0.054-0.185 mm), slightly curved, with the distal 2/3 denticulate, a few on the ventral surface; (2) short (0.07-0.11 mm),

bifid, with branches denticulate, on the dorsal and lateral surfaces. Cranium vaguely subhexagonal in anterior view, occipital border feebly impressed at the middle. Antennae minute, each with three sensilla, each bearing a moderately long spinule. Head hairs few, moderately long (0.039-0.12 mm), flexible, with the distal half denticulate. Labrum small, twice as broad as long, bilobed; anterior surface of each lobe with three minute hairs and/or sensilla; ventral border of each lobe with two or three sensilla and a few spinules; posterior surface of each lobe with three isolated and three contiguous sensilla; posterior surface spinulose, the spinules minute and in transverse rows. Mandibles heavily sclerotized, rather small, subtriangular in anterior view; apical tooth curved medially; two stout blunt teeth on the inner border. Maxillae large, apex paraboloidal; palp a skewed peg with one lateral (bearing a spinule) and four apical (two encapsulated and two bearing a spinule each) sensilla; galea a tall cone bearing two apical sensilla. Labium with the middle 2/3 raised into a broad ventral projection; anterior surface densely spinulose, the spinules in subtransverse rows; palp similar to maxillary palp but smaller; an isolated sensillum between each palp and the opening of the sericteries; the latter a transverse slit on the ventral surface. Hypopharynx with a few rather long rows of minute spinules. (Material studied: two dozen larvae from Burwood, Victoria, Australia, IX-12-51; collected by Dr. W. L. Brown and identified by him as *E. sp.* near *quadrispinosa* Forel.)

Epopostruma sp.

(Pl. 7, fig. 20)

Length about 3.6 mm. Quite similar to the Victorian species described above, except that the apical tooth of mandible is stout, straight and blunt. (Material studied: three dozen larvae from Aldgate, South Australia, VII-8-50; collected by Dr. W. L. Brown and identified by him as a new species near *quadrispinosa* Forel.)

Brown, 1953b; The larvae of *E. spp.* were observed to feed only on collembolans.

Genus *Mesostruma* Brown

Shaped somewhat like a crookneck squash; thorax and first abdominal somite forming a long slender neck, which is strongly curved ventrally; metathorax constricted; remainder of abdomen subovoidal. Body hairs sparse. Antennae small; with three sensilla each. Head hairs minute and simple. Posterior surface of labrum with ten sensilla.

Mesostruma laevigata Brown

(Pl. 9, figs. 1-3)

Length about 4 mm. Shaped somewhat like a crookneck squash; thorax and first abdominal somite forming a long slender neck, which is strongly curved ventrally; metathorax constricted; remainder of abdomen very stout and subovoidal. Anus ventral. Spiracles small; the mesothoracic the largest, the diameter decreasing posteriorly. Integument thin, flimsy and apparently without spinules. Body hairs apparently sparse. Cranium vaguely subhexagonal in anterior view; slightly broader than long, broadest at the antennal level; occipital border feebly concave. Antennae very small, each with three sensilla, each of which bears a spinule. Head hairs few, simple, minute (about 0.012 mm long). Labrum small; twice as broad as long; subrectangular, with the ventral corners rounded and the medial border slightly concave; anterior surface of each half with three or four sensilla near the ventral border; ventral border with two clusters of two or three sensilla each; posterior surface of each half with three isolated and two contiguous sensilla; dorsal 2/3 of posterior surface spinulose, the spinules minute and in short arcuate rows. Mandibles with the apical half heavily sclerotized, subtriangular in anterior view; apical tooth rather long and tapering to a rounded point, a narrow blade extends medially off the anterior surface and bears two round-pointed teeth. Maxillae short and lobose; palp chair-shaped with one lateral (with a spinule) and four apical (two encapsulated and two bearing a spinule each) sensilla; galea a frustum with two apical sensilla. Labium with numerous short rows of minute spinules on the anterior surface; palp similar to maxillary palp but shorter; an isolated sensillum between

each palp and the opening of the sericteries; the latter a short transverse slit on the ventral surface. Hypopharynx with a few short arcuate rows of spinules. (Material studied: a dozen larvae from Victoria, Australia; hairs broken off.)

Genus *Alistruma* Brown

Thorax and first abdominal somite strongly curved ventrally; dorsal profile C-shaped, ventral J-shaped; beginning with the anterior end of the prothorax the diameter increases to the mesothorax, decreases somewhat to abdominal somite I, increases to V and then decreases gradually to the posterior end, which is narrowly rounded. Body hairs sparse and moderately long. Of two types: (1) slightly curved, simple or denticulate, a few on the ventral surface; (2) mostly bifid (a few with one of the branches reduced to a denticle), the branches smooth or with very few denticles. Antennae small; with three sensilla each. Head hairs long, mostly simple (rarely denticulate). Posterior surface of labrum with 10 sensilla.

Alistruma n. sp.

(Pl. 9, figs. 4-10)

MATURE LARVA: Length about 3 mm. Thorax and first abdominal somite strongly curved ventrally; dorsal profile C-shaped, ventral J-shaped; beginning with the anterior end of the prothorax the diameter increases to the mesothorax, decreases somewhat to abdominal somite I, increases to V and then decreases gradually to the posterior end, which is narrowly rounded. Anus ventral, with a small posterior lip. Segmentation distinct. Spiracles small; the mesothoracic the largest, the diameter decreasing posteriorly. Integument of the ventral surface of the thorax and a few anterior abdominal somites and the dorsal surface of a few posterior somites with numerous short transverse rows of minute spinules. Body hairs uniformly distributed, moderately long and rather sparse. Of two types: (1) a few on the ventral surface, 0.036-0.16 mm long, slightly curved, simple or denticulate; (2) on the dorsal and lateral

surfaces, 0.1-0.21 mm long, mostly bifid (a few with one of the branches reduced to a denticle), the branches smooth or with a very few denticles. Cranium as broad as long; occipital angles smoothly rounded; occipital border straight. Antennae small, each with three sensilla, each of which bears a spinule. Head hairs few, long (0.027-0.18 mm), flexible and mostly simple (only rarely denticulate). Labrum small and very short (breadth three times length); narrowed dorsally; feebly bilobed due to a shallow medial impression of the ventral border; anterior surface of each lobe with three or four minute hairs and/or sensilla; ventral border of each lobe with one isolated and a cluster of three sensilla; posterior surface of each lobe with three isolated and a cluster of three sensilla; dorsal $\frac{3}{4}$ of posterior surface spinulose, the spinules minute and in short arcuate rows. Mandibles heavily sclerotized; somewhat short and stout; subtriangular in anterior view; apical tooth short; with two teeth on the inner border (one small and subapical, the other large and central). Maxillae short and lobose; palp a skewed peg bearing five sensilla (two apical and bearing a spinule each, two subapical and encapsulated and one lateral with a spinule); galea a cone bearing two apical sensilla. Labium with the anterior surface spinulose, the spinules minute and in short rows; palp similar to maxillary palp but smaller; an isolated sensillum between each palp and the opening of the sericteries; the

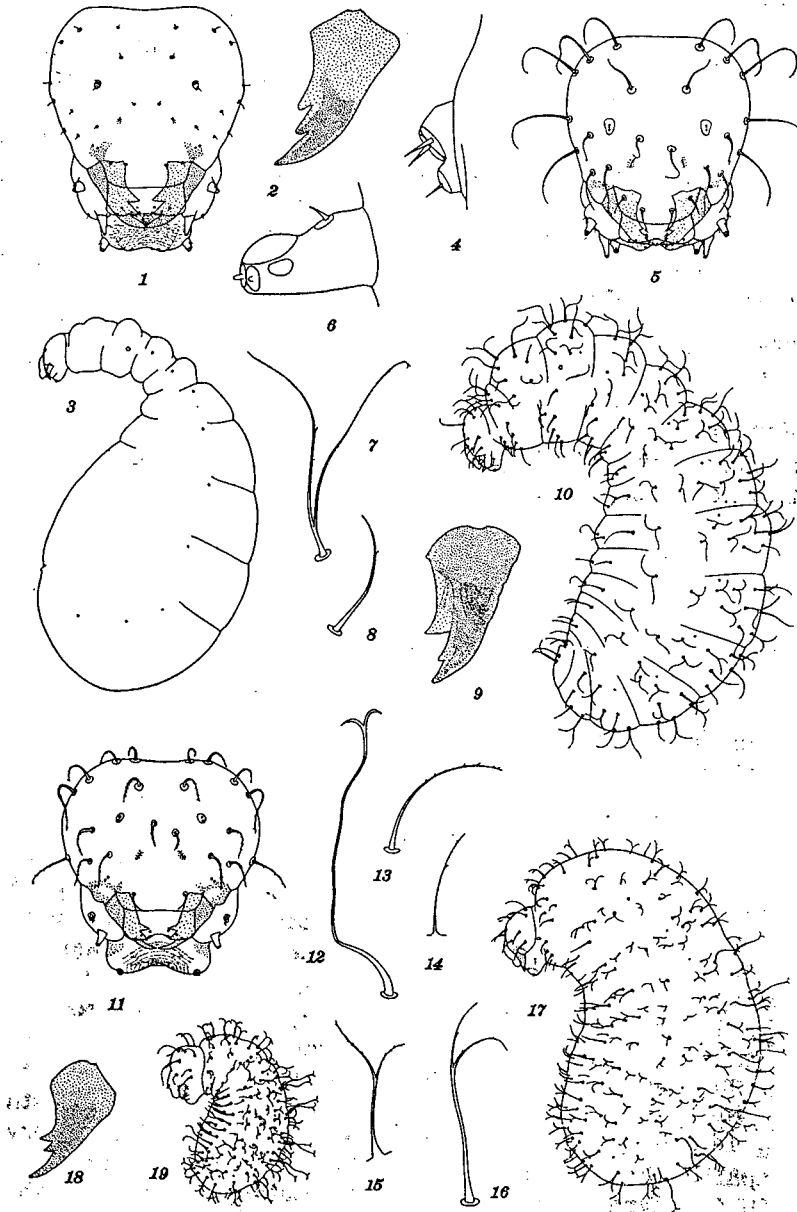
EXPLANATION OF PLATE 9

Mesostruma laevigata Brown, Figs. 1-3.—1, head in anterior view, $\times 95$; 2, left mandible in anterior view, $\times 185$; 3, larva in side view (hairs omitted), $\times 17$.

Alistruma n. sp., Figs. 4-10.—4, left antenna in lateral view, $\times 740$; 5, head in anterior view, $\times 95$; 6, left maxillary palp in lateral view, $\times 740$; 7 and 8, two types of body hairs, $\times 185$; 9, left mandible in anterior view, $\times 222$; 10, mature larva in side view, $\times 30$.

Smithistruma talpa (Weber), Figs. 11-18.—11, head in anterior view, $\times 130$; 12, anchor-tipped body hair, $\times 370$; 13 and 14, denticulate body hairs, $\times 370$; 15 and 16, bifid body hairs, $\times 370$; 17, mature larva in side view, $\times 43$; 18, left mandible in anterior view, $\times 235$.

Smithistruma nigrescens (Wheeler), Fig. 19, very young larva in side view, $\times 43$.



latter a short transverse slit. Hypopharynx spinulose, the spinules minute and in short transverse rows.

YOUNG LARVA: Length about 1.4 mm. Similar to the mature larva, except in the following details: postanal lip large; body and head hairs shorter; palps and galeae shorter.

Material studied: 20 larvae from Kallista, Victoria, Australia, IX-50; collected by Dr. W. L. Brown.

Brown, 1953b: The larvae feed only on collembolans.

Genus *Clarkistruma* Brown

Shaped somewhat like a crookneck squash; thorax and first abdominal somite forming a short and very stout neck which is bent ventrally to about 90°; remainder of abdomen much stouter, its dorsal profile c-shaped, its ventral nearly straight. Body hairs short, very sparse, stout, blunt-pointed and scarcely tapering. Of two types: (1) a few on the anterior portion of the prothorax and on the ventral surface, with denticles on or near the tip; (2) deeply bifid, with the branches strongly divergent and curved. Antennae minute; with three sensilla each. Head hairs long, stout, scarcely tapering, blunt, with denticles on and near the tip. Posterior surface of labrum without sensilla. Middle 2/3 of labium raised into a ventral projection.

Clarkistruma alinodis (Forel)

(Pl. 8, figs. 11-15)

Length about 2.4 mm. Shaped somewhat like a crookneck squash; thorax and first abdominal somite forming a short and very stout neck which is bent ventrally to about 90°; remainder of abdomen much stouter, its dorsal profile c-shaped, its ventral nearly straight. Anus ventral. Spiracles small; the mesothoracic the largest, diameter decreasing posteriorly. Integument of ventral surface of anterior somites with numerous short transverse rows of minute spinules; dorsal surface of last few abdominal somites with a few short rows of minute spinules. Body hairs very sparse, short, stout, blunt-pointed and scarcely tapering. Of two types: (1) a few on the anterior portion of the prothorax and on the ventral surface, 0.018-0.11 mm long,

with denticles near and on the tip; (2) deeply bifid with the branches strongly divergent and curved, 0.054-0.1 mm long. Cranium subhexagonal in anterior view; slightly broader than long; occipital border straight. Antennae minute, each with three sensilla, each of which bears a spinule. Head hairs few, long (0.036-0.1 mm), stout, scarcely tapering, blunt, with denticles near and on the tip. Labrum bilobed due to a wide and deep impression of the ventral border; breadth 1.6 times length; anterior surface of each lobe with three to five sensilla; ventrolateral corners spinulose; ventral border of each lobe with one isolated and two contiguous sensilla; posterior surface apparently without sensilla but with numerous rather long transverse rows of minute spinules. Mandibles with the apical half heavily sclerotized; apical tooth long, stout, sharp-pointed and curved medially; inner border produced into a blade bearing two rather stout acute teeth. Maxillae with the apex paraboloidal; palp vaguely chair-shaped with one lateral (bearing a spinule) and four apical (two encapsulated and two bearing a spinule each) sensilla; galea a tall cone bearing two apical sensilla. Labium large; middle 2/3 raised into a ventral projection; anterior surface spinulose, the spinules minute and in numerous arcuate rows; palp similar to maxillary palp but smaller; an isolated sensillum between each palp and the opening of the sericteries; the latter a very short transverse slit on the ventral surface. Hypopharynx with long transverse rows of minute spinules. (Material studied: twenty larvae from South Queensland; courtesy of Dr. W. L. Brown.)

Brown, 1953b: The larvae feed only upon collembolans.

Genus *Strumigenys* F. Smith

Short and stout; prothorax short and directed ventrally; head ventral; dorsal profile C-shaped, ventral feebly sinuate; diameter of body increasing gradually from anterior end to abdominal somite V, then decreasing to posterior end. Segmentation indistinct. Body hairs moderately numerous and short to moderately long. Of three types: (1) on the ventral surface, few, denticulate, flexible; (2) bifid, with the branches denticulate; (3) anchor-tipped, with tortuous shaft, four in a row across the dorsum of

each abdominal somite I-V. Antennae small, with only two sensilla each. Head hairs short to moderately long, flexible and denticulate. Posterior surface of labrum with six sensilla. Maxillary palp a low elevation bearing four sensilla. Labium with a pair of mammiform ventrolateral lobes, each bearing a palp which is a low elevation with four sensilla.

Strumigenys louisianae Roger

(Pl. 10, figs. 1-6)

MATURE LARVA: Length about 2 mm. Short and stout; prothorax directed ventrally; head ventral; anterior end formed from the dorsum of the prothorax; dorsal profile C-shaped, ventral feebly sinuate; diameter of body increasing gradually from the anterior end to abdominal somite V, then decreasing to the posterior end, which is broadly rounded. Anus ventral. Leg vestiges present. Segmentation indistinct. Spiracles small, diameter decreasing gradually from the mesothoracic toward the posterior end. Integument of ventral surface of thorax and first three abdominal somites with rather long transverse rows of minute spinules; a few shorter rows of minute spinules on the posterior surface of the last few abdominal somites. Body hairs moderately numerous, uniformly distributed (except on the naked midventral surface of the thorax and abdominal somites I-III), short to moderately long. Of three types: (1) on the ventral surface of the thorax and of abdominal somites I-VI, few, denticulate, 0.027-0.126 mm long, flexible; (2) on the dorsal and lateral surfaces, 0.054-0.148 mm long, bifid, with the branches finely denticulate; (3) anchor-tipped, with tortuous shaft, about 0.165 mm long, four in a row across the dorsal surface of each abdominal somite I-V. Cranium vaguely subhexagonal; slightly broader than long; middle of occipital border feebly convex. Antennae minute, each with only two sensilla; each sensillum bears a spinule. Head hairs few, moderately long (0.054-0.125 mm), flexible and denticulate. Labrum small and short; breadth 2.5 times length; bilobed due to a median impression of the ventral border; anterior surface of each lobe with three sensilla; ventral border of each

lobe with a few minute spinules and two contiguous sensilla; posterior surface of each lobe with three sensilla; middle half of posterior surface densely spinulose, the spinules minute and in subtransverse rows. Mandibles subtriangular in anterior view, with the apical half heavily sclerotized; apical tooth long, stout, sharp-pointed and curved medially; with two sharp-pointed teeth on the inner border. Maxillae short and lobose; palp a low elevation bearing four sensilla; galea digitiform, with two apical sensilla. Labium large; anterior surface spinulose, the spinules in short curved subtransverse rows; with a pair of mammiform ventrolateral lobes, each bearing a palp, which is a low elevation bearing four sensilla; an isolated sensillum between each palp and the opening of the sericteries; the latter a very short transverse slit. Hypopharynx densely spinulose, the spinules minute and in numerous long subtransverse rows. (Material studied: two dozen larvae from Alabama and Mississippi; courtesy of Dr. W. L. Brown.)

Wilson, 1953: The larval food is chiefly Collembola, but a few other arthropods are occasionally eaten (p. 481). "Larvae are fed by being placed directly on the prey. As many as ten or more may be piled at first on the same collembolan, and since they are active feeders they may wholly consume a small individual within several hours. The final fragments of the insect are held aloft, ponerine fashion. No case of ingluvial feeding of the larvae by the workers was ever observed, although occasionally workers were seen passing food in this manner" (p. 483). The life cycle was found to be: egg, 12 days; larva, 29 days; pupa, 12 days. (p. 491).

Strumigenys australis Forel

(Pl. 10, figs. 8-15)

IMMATURE (?): Length about 1.6 mm. Generally similar to *louisianae*, except in the following characters: Segmentation distinct. Spinules restricted to ventral surface of thorax. Body hairs — (1) length 0.009-0.12 mm, without alveolus and articular membrane; (2) shorter (0.054-0.11 mm), with or without alveolus and articular

membrane; (3) as in *louisianae*. Cranium transversely subelliptical; breadth 1.4 times length; middle of occipital border straight. Head hairs shorter (0.029-0.09 mm). Labrum shorter and broader (breadth 2.8 times length); anterior surface of each lobe with four sensilla; entire posterior surface spinulose, the spinules minute and in long subtransverse rows. Mandibles shorter and stouter; apical tooth long, slender and round-pointed; subapical tooth anterior, proximal medial tooth much larger. Labial palp with five sensilla. (Material studied: 10 larvae from Queensland, Australia; courtesy of Dr. W. L. Brown.)

Brown, 1953b, p. 467: The larvae feed only on Collembola.

Strumigenys elongata Roger

Length about 1.7 mm. Similar to *louisianae*, except in the following details: Body hairs—(1) occurring back as far as abdominal somite VIII, shorter (0.018-0.12 mm); (2) shorter (0.014-0.12 mm); (3) slightly longer (about 0.18 mm). Head moderately large. Head hairs shorter (0.036-0.1 mm). Apical tooth of mandibles longer and slenderer. (Material studied: 10 larvae and semipupae from Mexico, collected by E. O. Wilson; courtesy of Dr. W. L. Brown.)

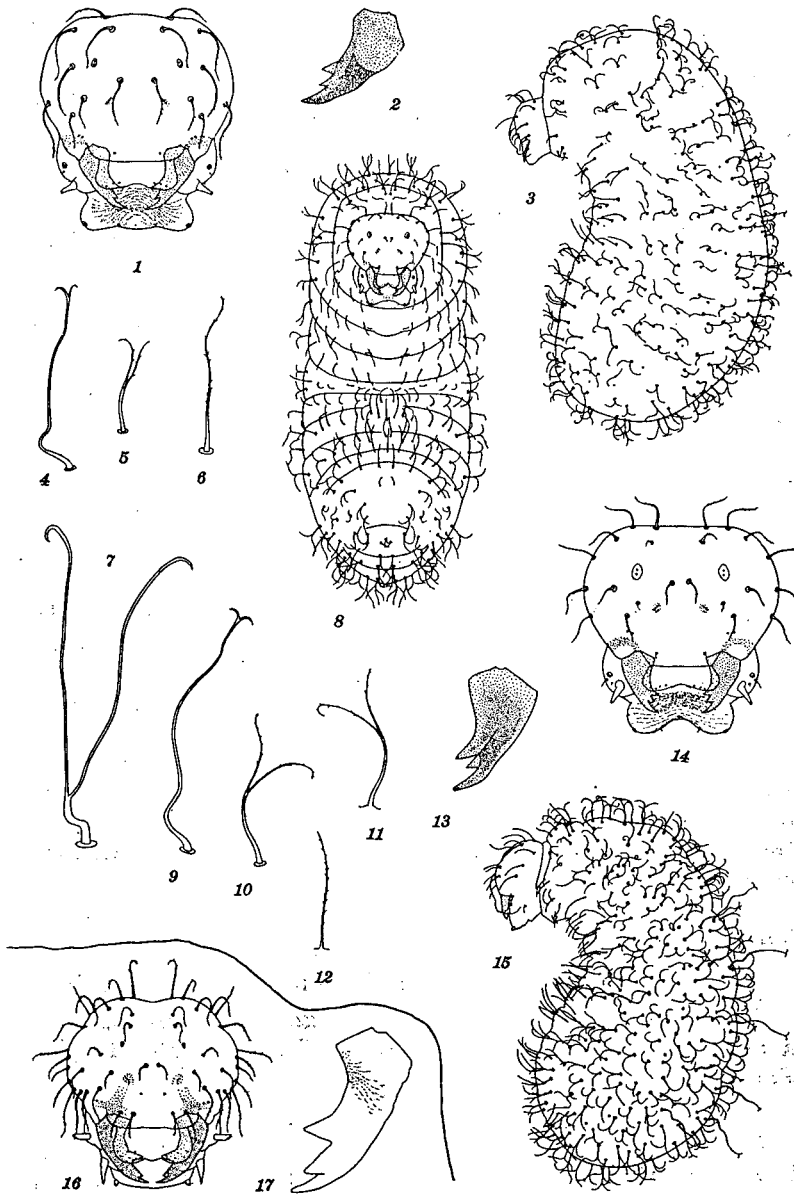
EXPLANATION OF PLATE 10

Strumigenys louisianae Roger, Figs. 1-6.—1, head in anterior view, $\times 105$; 2, left mandible in anterior view, $\times 185$; 3, mature larva in side view, $\times 38$; 4-6, three types of body hairs, $\times 185$.

Strumigenys nidifex Mann, Fig. 7, a deeply bifid anchor-tipped hair, $\times 185$.

Strumigenys australis Forel, Figs. 8-15.—8, immature (?) larva in ventral view, $\times 43$; 9, anchor-tipped body hair, $\times 185$; 10 and 11, bifid body hairs, $\times 185$; 12, denticulate body hair, $\times 185$; 13, left mandible in anterior view, $\times 185$; 14, head in anterior view, $\times 95$; 15, immature (?) larva in side view, $\times 43$.

Basicerus sp., Figs. 16 and 17.—16, head in anterior view, $\times 44$; 17, left mandible in anterior view, $\times 86$.



WHEELER AND WHEELER—BASICEROTINI AND DACETINI

Strumigenys lewisi Cameron

YOUNG LARVA: Length about 1 mm. Generally similar to *louisianae*. (Material studied: six young larvae from Japan; courtesy of Cho Teranishi.)

Strumigenys nidifex Mann

(Pl. 10, fig. 7)

Length about 3.5 mm. Similar to *louisianae*, except in the following details: Mesothorax more swollen, abdomen less so. Body hairs — (1) occurring back as far as abdominal somite VII and covering all the prothorax, except the middorsal surface, longer (0.036-0.18 mm); (2) longer (0.054-0.148 mm); (3) longer (about 0.3 mm) and sometimes deeply bifid, each branch bearing a single anchor-hook. Head hairs shorter (0.054-0.08 mm). Mandibles longer and narrower with more slender round-pointed teeth. (Material studied: a dozen larvae and semipupae from Fiji; courtesy of Dr. W. L. Brown.)

Strumigenys perplexa (F. Smith)

Length about 1.6 mm. Similar to *louisianae*, except in the following details: Spinules on the ventral surface of the thorax and first abdominal somite only. Body hairs — (1) occurring back as far as abdominal somite VIII, shorter (0.036-0.087 mm); (2) shorter (0.036-0.09 mm); (3) usually on abdominal somites I-IV, rarely one or two on V. Head hairs shorter (0.036-0.092 mm). Anterior surface of each lobe of the labrum with four or five sensilla. (Material studied: numerous larvae from Victoria, Australia; courtesy of Dr. W. L. Brown.)

Brown, 1953b, p. 467: The larvae feed only on Collembola.

Strumigenys saliens Mayr

Apparently very similar to *louisianae*. (Material studied: a single larva with hairs broken off, from "Rio Negro, Paraná.")

Strumigenys n. sp.

Length 1.9 mm. Similar to *louisianae* except in the following details: Body hairs — (1) shorter (0.027-0.1 mm); (2) shorter (0.054-0.134 mm); (3) slightly longer (about

0.173 mm). Cranium transversely subelliptical; breadth 1.5 times length; occipital border feebly concave at the middle. Head hairs shorter (0.042-0.1 mm). Labrum twice as broad as long; with four sensilla on the anterior surface of each lobe. (Material studied: 10 larvae from Malanda, Queensland, 2400', 4-XI-50, W. L. Brown.)

Genus *Smithistruma* Brown

Short and stout; diameter increasing gradually from the mesothorax to abdominal somite IV, then decreasing to the posterior end, which is broadly rounded; thorax and first abdominal somite strongly curved ventrally; head ventral; dorsal profile c-shaped, ventral feebly sinuate. Segmentation indistinct. Body hairs moderately numerous and short to moderately long. Of three types: (1) on the ventral surface, few, denticulate, slightly curved; (2) bifid, with a few denticles on each branch; (3) anchor-tipped, with tortuous shaft, four in a row across the dorsum of each abdominal somite I-IV, I-V or I-VI. Antennae small; with two sensilla each. Head hairs short to long, flexible and denticulate. Posterior surface of labrum with six sensilla. Maxillary palp a low elevation bearing four sensilla. Labium with a pair of mammiform ventrolateral lobes, each bearing a palp, which is a low elevation with four or five sensilla.

Brown, 1953a, p. 43; "The larvae are whitish in color and rest motionless or nearly so in the brood chambers. They are well cared for by the workers, which feed them at least part of the time by placing them directly on top of freshly-killed springtails. In my particular colony of *S. rostrata*, I never once observed regurgitation from worker to larva, but since my colony did not seem very healthy or vigorous, I would certainly not say that the larvae are never fed by regurgitation in nature."

Smithistruma talpa (Weber)

(Pl. 9, figs. 11-18)

MATURE LARVA: Length about 1.6 mm. Short, stout and turgid; diameter increasing gradually from the mesothorax to abdominal somite IV, then decreasing to the posterior end (which is broadly rounded); anterior end broadly

rounded and formed from the dorsum of the prothorax; thorax and first abdominal somite strongly curved ventrally; head ventral; dorsal profile C-shaped, ventral feebly sinuate. Anus ventral. Segmentation indistinct. Spiracles small, diameter decreasing slightly from the mesothoracic toward the posterior end. Integument of the ventral surface of the thorax and abdominal somites I and II with short rows of minute spinules. Body hairs moderately numerous, short to moderately long and (except for a small ventral naked area on the thorax and first two abdominal somites) uniformly distributed. Of three types: (1) few, 0.018-0.072 mm long, on the ventral surface of the thorax and abdominal somites I-VI, slightly curved and denticulate; (2) on the dorsal and lateral surfaces, 0.018-0.072 mm long, bifid, with a few denticles on each branch, the most numerous type; (3) anchor-tipped, with tortuous shaft, about 0.125 mm long, four in a row across the dorsal surface of each abdominal somite I-VI; types 1 and 2 with or without alveolus and articular membrane. Head moderately large; cranium transversely subelliptical in anterior view, a fourth broader than long; occipital border slightly concave at the middle. Antennae small, each with only two sensilla, each of which bears a short spinule. Head hairs few, flexible, moderately long (0.054-0.072 mm) and denticulate. Labrum small, breadth 2.7 times length; bilobed, due to a median concavity of the ventral border; anterior surface of each lobe with three sensilla; ventral border of each lobe with a few spinules and two contiguous sensilla; posterior surface of each lobe with three sensilla; middle half of posterior surface spinulose, the spinules minute and in transverse rows. Mandibles heavily sclerotized; subtriangular in anterior view; apical tooth long, slender, sharp-pointed and curved medially; two sharp-pointed teeth on the inner border. Maxillae short and lobose; palp a low elevation bearing four sensilla; galea digitiform, with two apical sensilla. Labium large; anterior surface spinulose, the spinules in curved subtransverse rows; with a pair of mammiform ventrolateral lobes, each bearing a palp, which is a low elevation with four sensilla; an isolated sensillum between each palp and the opening of the sericteries; the latter a short

transverse slit. Hypopharynx spinulose, the spinules in rather long transverse rows. (Material studied: two dozen larvae from Alabama; courtesy of Dr. W. L. Brown.)

Wilson, 1953, p. 486: The food consists chiefly of *Collembola*, but a few other arthropods are eaten.

Smithistruma brevisetosa (M. R. Smith)

Wilson, 1953, p. 485: "This species appears to be identical in food habits to *Smithistruma rostrata*."

Smithistruma clypeata (Roger)

Wilson, 1953: The food of the larvae consists mostly of *Collembola*, but a few other arthropods are eaten (p. 486). The life cycle was found to be: egg, 14 days; larva, 25 days; pupa, 14 days (p. 491).

Smithistruma dietrichi (M. R. Smith)

Wilson, 1953, p. 487: The larval food consists chiefly of *Collembola*, but a few other arthropods are used.

Smithistruma epinotalis (Weber)

SEMIPUPA (?): Length about 1.8 mm. Similar to *talpa*, but differing in the following details: Anchor-tipped body hairs slightly longer (about 0.15 mm) and occurring on abdominal somites I-IV only. Occipital border of cranium slightly convex at the middle. Head hairs shorter (0.036-0.054 mm). Labial palps each with five sensilla. (Material studied: two damaged specimens from Costa Rica and Mexico.)

Smithistruma missouriensis (M. R. Smith)

Wilson, 1953, p. 486: The food of the larvae consists of *Collembola*.

Smithistruma nigrescens (Wheeler)

(Pl. 9, fig. 19)

MATURE LARVA: Length about 1.6 mm. Similar to *talpa* but differing in the following details: Body hairs — (1) slightly longer (0.02-0.09 mm); (2) longer (0.063-0.088 mm); (3) longer (about 0.144 mm) and occurring on abdominal somites I-V only. Head hairs slightly longer (0.056-0.085 mm). Mandibles more slender. Labial palp with five sensilla.

· VERY YOUNG LARVA: Length about 0.84 mm. Hairs relatively longer; head and postanal lip relatively larger. Otherwise very similar to mature larva.

Material studied: two dozen larvae from Cuba, collected by E. O. Wilson; courtesy of Dr. W. L. Brown.

Smithistruma rostrata (Emery)

YOUNG LARVA: Length about 1.4 mm. Generally similar to *talpa* except in the following details: Head relatively larger. Anchor-tipped body hairs longer (about 0.14 mm). Antennae moderately large. Anterior surface of each lobe of the labrum with four sensilla and a few oblique rows of minute spinules. Labial palp with five sensilla. (Material studied: two dozen larvae from Illinois; courtesy of Dr. W. L. Brown.)

Wilson, 1953: "Essentially similar to *Trichoscapa membranifera* in details of . . . larval feeding and in the total absence of trophallaxis" (p. 485). The life cycle was found to be: egg, 9 days; larva, 31 days; pupa, 19 days (p. 491).

Smithistruma schulzi (Emery)

Length about 1.7 mm. Similar to *talpa* but differing in the following details: Anchor-tipped body hairs longer (about 0.14 mm) and occurring on abdominal somites I-IV only. Head hairs shorter (0.027-0.054 mm). Anterior surface of each lobe of the labrum with four sensilla. Mandibles rather small. (Material studied: three larvae from Brazil.)

Smithistruma studiosi (Weber)

Apparently similar to *talpa*. (Material studied: three damaged specimens from Costa Rica.)

Smithistruma (*Wessonistruma*) *pergandei* (Emery)

IMMATURE LARVA: Length about 1.6 mm. Similar to *talpa*, except in the following details: Body hairs—(1) slightly longer (0.027-0.1 mm); (2) longer (0.045-0.1 mm); (3) considerably longer (about 0.17 mm). Head hairs shorter (0.036-0.054 mm). Mandibles more slender. (Material studied: seven larvae from Virginia; courtesy of Dr. W. L. Brown.)

Wesson, 1936, p. 173: "The larvae are fed by being placed on top of whole springtails."

Genus *Trichoscapa* Emery

Trichoscapa membranifera Emery

Wilson, 1953: "Details of larval feeding seem to be similar to those in the case of *Strumigenys*. In addition, the *Trichoscapa* were never observed to participate in any sort of trophallaxis, either between workers or between workers and larvae" (p. 484). The life cycle was found to be: egg, 13 days; larva, 19 days; pupa, 19 days (p. 491).

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